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Psychosocial Functioning, Personality, and Body Image Following Vertical Banded Gastroplasty

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Abstract

Background In addition to increased risks of morbidity and mortality, extreme obesity is substantially associated with psychosocial problems. Therefore, the ultimate goal of bariatric surgery should not only be reducing weight and counteracting comorbid conditions but also improving psychosocial functioning. In addition to being an important goal of bariatric surgery, enhanced psychosocial functioning may motivate patients to adhere to adequate health behavior to maintain the surgically established weight loss.

Methods We evaluated early postoperative psychosocial functioning in several domains over time. Preoperatively as well as 6, 12, and 24 months after vertical banded gastroplasty, 104 patients were psychologically assessed using a semi-structured interview and psychological questionnaires focusing on psychosocial functioning, personality, and body image.

Results Over time, we found significant changes in weight: 2 years excess weight loss was 58.6%. In addition, most aspects of psychosocial functioning showed significant improvements over time. However, initial improvements in depressive symptoms, sleeping problems, and neuroticism did not last. With respect to personality features, only short-term changes in self-esteem were found. The most robust improvements were seen in the case of body image. Finally, within the patient group, there was a wide variability in changes.

Conclusion Vertical banded gastroplasty not only leads to considerable weight loss but also to significant improvements in psychosocial functioning. However, some improvements waned over time, and successful postoperative functioning did not apply to all patients.

Keywords Morbid obesity · Bariatric surgery · Vertical banded gastroplasty · Psychosocial functioning · Personality · Psychopathology · Body image

Introduction

Obesity is a major public health concern. Its prevalence is increasing globally [1]. In addition to an increased risk of morbidity and mortality caused by medical conditions [2], extreme obesity is associated with debilitating psychological and social consequences especially in patients seeking surgery [3–6]. Psychological consequences of extreme obesity are, among others, anxiety, depression, low self-esteem, and negative body image [5–10]. Socially, the extremely obese have to deal with prejudice, discrimination, and social isolation [11].

Because only surgical treatment results in long-term weight reduction and the improvement or cure of comorbidities, including reduction of psychopathology [3–6], the number of procedures performed has more than doubled within a few years [12]. However, studies show great variation in outcome. In contrast to research showing large and long-lasting improvements, other studies suggest that postoperative improvements lag behind functioning of normative groups or show a decline over the years [4, 5].

Enhanced psychosocial functioning is an important goal of bariatric surgery. It may motivate patients to adhere to adequate health behavior to maintain the surgically established

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weight loss [13]. In addition to medical–somatic and surgical–technical factors, success of bariatric surgery is especially influenced by the extent of successful adjustment of eating patterns, which, for a substantial part, can be attributed to psychological factors. Therefore, success after bariatric surgery should not only reflect weight loss and improvement or cure of comorbid conditions but also improvements in eating behavior, psychosocial variables, and quality of life [14]. However, in contrast to physical changes, psychosocial changes are not studied as systematically or diligently yet [15]. To facilitate the identification of the psychological variables that are related to success and the development of treatment interventions to enhance adjustment and success, a better understanding of patients' psychosocial functioning after bariatric surgery is needed.

Materials and Methods

The present study was designed to increase our understanding of patients' changes in psychosocial functioning, personality, and body image during the first 2 years after vertical banded gastroplasty (VBG). The main research questions were: what specific improvements can be achieved, is postoperative functioning noticeable different from functioning in relevant normative groups, and do all patients profit? These questions were examined based on data collection preoperatively and 6, 12, and 24 months after VBG.

Procedures

The restrictive operation technique used in our hospital is hand-assisted laparoscopic vertical banded gastroplasty, with a complete division between the vertical staple lines. VBG is a relative simple, safe, and cost-effective intervention with fewer side effects than other procedures [16]. Notwithstanding this, mixed long-term results, such as weight regain and dietary problems, have been reported [17]. Contrary to the situation in the USA, in The Netherlands, the numbers of VBGs that have been performed in the last 5 years is rather stable, despite the fact that the number of adjustable gastric banding procedures is showing an enormous increase.

Materials

Earlier studies of psychosocial factors in the surgical treatment of extreme obesity have not provided consistent findings, which may, in part, be caused by the employment of a wide variety of non-standardized assessment procedures of questionable reliability and validity [11]. In the present study, we assessed preoperative as well as post-

operative psychosocial functioning, personality, and body image using a semi-structured interview and three standardized questionnaires. As interview-based psychological studies may be questionable, we will report here only on the questionnaire data. Preoperatively as well as on three follow-up assessment points, patients filled in the Symptom Checklist-90 (SCL-90) [18], the Dutch Personality Questionnaire (NVP) [19], and the Body Attitude Test (BAT) [20]. The SCL-90 is a multidimensional psychopathology indicator with eight subscales and one summarized score (psychoneuroticism); its psychometric qualities are satisfactory to good [21]. In addition to neuroticism, the NPV measures six personality characteristics; its psychometric qualities are also satisfactory to good [22]. The BAT measures subjective body experience and the attitude towards one's own body; it has three subscales and one summarized total score, is commonly used in Europe, and is a reliable and valid questionnaire [20].

Patients

In the context of standard preoperative evaluation, 131 patients who underwent VBG in our hospital between January 2001 and October 2004 were psychologically assessed. In addition to the inclusion criteria determined by IFSO [23], we required 10% preoperative weight loss with a minimum of 12 kg. From these 131 patients, 104 (79.4%) could be included in our study; others did not respond to our repeated requests for follow-up or sending back questionnaires. The studied patient group consisted of 91 (87.5%) female and 13 (12.5%) male patients. Preoperatively, they had a mean age of 38.4 ± 8.3 years, an average body mass index (BMI) of 45.4 ± 5.1 , and a mean percentage excess weight of $104.5 \pm 22.1\%$.

Statistical Analyses

Statistical analyses were performed using the SPSS 14.0-packet (SPSS for Windows, Rel. 14.0. 2005, SPSS Inc., Chicago). To study changes over time in weight, psychosocial functioning, personality, and body image, mixed between-within subjects analyses of variance for repeated measures were performed (ANOVA; time as within-subjects factor, gender as between-subjects factor). To identify waning of changes, Bonferroni post hoc equations were used. To compare patients' questionnaire scores to normative data, we used one-sample *t* tests. To identify heterogeneity in postoperative psychosocial functioning, descriptive statistics were used using summarized scales whenever possible for reasons of clarity. In reporting excess weight (EW) and excess weight loss (EWL), we followed the guidelines of Deitel and Greenstein [24].

Results

Weight Loss

Over time, using ANOVA, substantial and significant changes in mean BMI, EW, and EWL were found. From preoperative status to 2 years after surgery, BMI and EW significantly ($P \leq 0.001$) decreased 13.5 points and 58.6%, respectively, which represent a large size (partial $\eta^2 = 0.83$) [25]. After 2 years, using the criterion that an operation can be conceived of as successful when $EWL \geq 50\%$ [26], 61% of the patients had a successful operation. Preoperatively, 91.3% of the patients were extremely obese; in contrast, 2 years after surgery, only 12% was extremely obese.

Psychosocial Functioning

Our earlier literature review suggests that psychopathology is related to extreme obesity, manifesting itself mostly as depression or anxiety [11].

In assessing psychosocial functioning, we used the SCL-90 to assess short-term psychosocial functioning [18] and the NPV neuroticism scale to measure long-term neuroticism [19]. With respect to all aspects, except for hostility, significant changes over time were found (for most of the comparisons, $P \leq 0.001$; for neuroticism, $P \leq 0.01$; for sleeping problems, $P \leq 0.05$). For the majority of alterations, large effect sizes were found [25]. Post hoc analyses showed that compared to the preoperative status, for most aspects of psychosocial functioning, scores were significantly lower on all follow-up assessment points, reflecting better psychosocial functioning. However, depressive symptoms and

neuroticism were only significantly lower 6 months and 1 year after surgery; sleeping problems were lower only 6 months after surgery. For most aspects of psychosocial functioning, there was only a significant decrease in scores from preoperative status to 6 months postoperatively, however, not between 6 months and 1 year or between 1 and 2 years postoperatively (Table 1).

Furthermore, we compared patients' mean scores on psychosocial functioning to corresponding scores obtained in relevant normative groups, reflecting the general population [18, 19]. Compared to those normative groups, mean preoperative scores for psychosocial functioning were significantly higher, except for hostility. However, with respect to preoperative neuroticism, no significant difference was found. Postoperatively, there was a mixed picture. In spite of these inconsistencies, the overall picture revealed that on most subscales and most follow-up assessment points, patients' mean scores were not significantly different from the corresponding scores obtained in the normative groups. Two years after surgery, patients' mean scores on measures of sleeping problems and somatic complaints were again significantly higher than the normative group's scores. As to neuroticism, patients' postoperative mean scores were significantly lower than the normative group's scores on all follow-up assessment points. Despite these differences, all postoperative patients' scores fell in the below mean, mean, or above mean categories of the normative groups' scores.

Personality

Because personality substantially influences health behavior, personality characteristics may be relevant for adjustment to

Table 1 Postoperative changes in psychosocial functioning (mean \pm SD)

SCL-90	Preoperative	6 months	1 year	2 years	Partial η^2
Anxiety	14.3 \pm 5.0	11.7 \pm 2.4***	12.1 \pm 3.9	12.6 \pm 5.6	.23
Phobic complaints	9.3 \pm 3.6	7.4 \pm 1.1***	7.5 \pm 1.6	7.9 \pm 3.1	.20
Depression	24.8 \pm 8.6	20.8 \pm 6.3***	20.9 \pm 7.1	23.1 \pm 11.3	.18
Somatic complaints	21.2 \pm 7.9	16.2 \pm 3.5***	17.0 \pm 5.2	17.9 \pm 6.7	.29
Obsessive	15.0 \pm 5.0	11.6 \pm 2.7***	12.0 \pm 3.1	12.7 \pm 5.1	.28
Sensitivity	28.7 \pm 10.4	23.0 \pm 6.4***	22.8 \pm 6.1	24.2 \pm 10.8	.25
Hostility	7.3 \pm 1.7	7.2 \pm 2.0	7.1 \pm 1.5	7.3 \pm 2.4	.06
Sleeping problems	5.7 \pm 2.9	4.6 \pm 2.3*	4.9 \pm 2.5	5.5 \pm 3.1	.09
Psychoneuroticism	139.5 \pm 41.0	113.0 \pm 22.7***	114.8 \pm 26.4	122.8 \pm 45.2	.30
N	93	93	93	93	
Neuroticism (NPV)	11.98 \pm 8.9	8.5 \pm 7.4**	8.0 \pm 6.6	9.3 \pm 8.8	.15
N	94	94	94	94	

Because of listwise exclusion, $n = 93$ (SCL-90) or 94 (NPV) on all moments; Obsessive: obsessive compulsive behavior; Sensitivity: mistrust and interpersonal sensitivity.

*** $P < 0.001$

** $P < 0.01$

* $P < 0.05$

Table 2 Postoperative changes in personality characteristics (mean±SD)

NPV subscales	Preoperative	6 months	1 year	2 years	Partial η^2
Social anxiety	8.9±7.9	6.8±6.5	7.0±6.5	7.5±7.1.	0.07
Rigidity	24.4±7.3	24.0±7.9	24.2±7.4	23.7±7.8	0.03
Hostility	14.0±8.5	14.1±8.6	14.0±8.9	15.3±9.3	0.05.
Egoism	9.7±4.7	10.6±5.1	9.9±4.8	10.4±5.0	0.04
Dominance	13.9±6.4	15.3±7.5	15.3±7.2	15.0±7.3	0.06
Self-esteem	27.9±6.0	29.7±5.3	29.9±5.5*	28.6±6.7	0.14
<i>N</i>	94	94	94	94	

Because of listwise exclusion, $n=94$ on all moments.

* $P<0.01$

surgery [27]. According to earlier literature reviews, extremely obese individuals can be described as, among others, immature persons having a poor impulse control and a low self-esteem [28]. With respect to postoperative personality change, mixed results have been reported. For instance, some studies suggest that patients still have more pathology than comparison groups [13], whereas other research suggests that personality remains largely unchanged [3].

In assessing personality with the NPV [19], over time, we only found, with a large effect size [25], a significant ($P\leq 0.01$) change in self-esteem. Post hoc analyses revealed that compared to the preoperative status, self-esteem was significantly higher 1 year postoperatively. Six months after surgery, there was a tendency to significance ($P=0.06$). Two years postoperatively, however, no significant difference was found. Also, no significant differences were found between follow-up assessment points (Table 2).

We did not find many significant personality changes, but compared to normative data [19], we did find some significant differences. Compared to a relevant normative group, reflecting the general population, patients' mean preoperative scores on social anxiety, dominance, and self-esteem were not significantly different. However, they were after surgery, albeit not on all follow-up assessment points and not always for both sexes. Postoperatively, patients' scores on social anxiety were lower, whereas their scores on dominance and self-esteem were higher than the corresponding scores obtained in the normative group. On scales of Hostility and Egoism, preoperatively, patients had significant lower mean scores; postoperatively, this was only the case for some small

subgroups. On the Rigidity measure, patients had significantly lower mean scores on all measurement moments preoperatively as well as postoperatively. All patients' mean scores fell in the below mean, mean, or above mean categories of the normative group's scores.

Body Image

Some studies suggest that especially for female patients, the desire to improve their physical appearance and avoidance of embarrassment are the most common motivators for bariatric surgery [29]. Also, improved body image would be one of the main reasons for post-surgical psychological improvement, better social integration, and enhanced quality of life [30]. Weight loss after bariatric surgery leads to marked improvements in body image and attractiveness and to less shame. However, with time, some patients still feel overweight, are discontent with the increasing skin folds [13], or still may have more concern with their body shape and size than controls [31].

In our earlier study, we found that preoperatively, patients reported significantly higher body dissatisfaction and negative body image than general population samples [28]. In the present study, using the BAT [20], over time, we found significant ($P\leq 0.001$) changes in negative appreciation of body size, lack of familiarity with one's own body, general body dissatisfaction, and the summarized BAT score, reflecting improved body image and large effect sizes [25]. Post hoc analyses showed that compared to the preoperative status, scores were significantly ($P\leq 0.001$)

Table 3 Postoperative changes in body image (mean±SD)

	Preoperative	6 months	1 year	2 years	Partial η^2
Negative appreciation of body size	26.2±5.8	14.9±7.1*	14.4±8.2	14.2±8.2	0.59
Lack of familiarity with one's own body	16.5±7.2	7.5±4.7*	7.1±4.8	7.5±6.1	0.52
General body dissatisfaction	15.2±3.6	8.1±4.6*	8.0±4.6	8.3±5.0	0.61
Total BAT score	64.0±15.4	36.9±15.6*	35.8±16.2	35.9±17.4	0.63
<i>N</i>	97	97	97	97	

Because of listwise exclusion, $n=97$ on all moments.

* $P<0.001$

lower on all three follow-up assessment points. We found significant decreases between preoperative status and 6 months postoperatively, however, not between 6 months and 1 year or between 1 and 2 years after surgery (Table 3). Also, in contrast to the preoperative situation, on all three follow-up assessment points, body image was significantly correlated to BMI, reflecting a more positive body image when BMI was lower (r varied from 0.37, 6 months postoperatively, to 0.29, 1 year postoperatively, and 0.31, 2 years after surgery).

Although we found significant improvements in body image over time, on all moments, preoperatively as well as postoperatively, and on all scales, patients' mean scores were significantly ($P \leq 0.001$ or $P \leq 0.01$) higher than those of (female students) normative groups [20, 32].

Heterogeneity in Postoperative Psychosocial Functioning

Most studies report broad psychosocial improvements after bariatric surgery. However, a significant minority of extremely obese patients do not benefit from surgery [4]. Some patients may even have difficulties in adapting psychosocially to the various consequences of bariatric surgery [13].

In the present study, in addition to a large variation in EWL, we found substantial variance with respect to changes in psychosocial functioning. Especially with respect to psychoneuroticism and neuroticism, most patients reported postoperative improvements; however, this was not the case for all patients. For instance, in the case of psychoneuroticism, 77 out of 99 patients (77.8%) reported improvement after 6 months; in contrast, 21 patients (21.2%) had higher scores, and one patient did not change. After 24 months, approximately two thirds of the patient group (64.7%) still had better scores on psychoneuroticism, whereas one third (31.4%) showed signs of an increase in psychoneuroticism.

In the case of personality characteristics, a mixed picture was found; however, in general, there were only small differences between patients reporting positive or negative changes. Regarding body image, almost all patients reported improvements, and these were quite stable over time.

Discussion

After vertical banded gastroplasty, in addition to substantial and significant weight loss, patients also changed for the better in body image and most domains of psychosocial functioning. With respect to personality, only a significant improvement in self-esteem was found. Unfortunately, there was substantial variance in improvements, and some improvements waned over time.

Most of our findings are in line with other studies, with respect to weight loss [33], as well as regarding improvements in psychosocial functioning and body image [7, 8]. The fact that we could not demonstrate many significant changes in patients' personality is in contrast to the results of some studies [34], but is consistent with the suggestion that there is no obese personality [35]; furthermore, because of the stability of personality, these findings might be expected. The impact of bariatric surgery seems to be more in the areas of symptoms of psychopathology.

Just like others, we found a decline of some psychosocial improvements over the years [13]. Various explanations have been suggested for waning psychosocial improvements, for example, stabilization or rising of patients' weight, disappointment that life did not improve dramatically after substantial loss of weight, or difficulties in adapting psychologically to the consequences of bariatric surgery [13]. Also, our results concerning patients' postoperative heterogeneity are in accordance with earlier findings [36]. These outcomes underscore the suggestion that vertical banded gastroplasty, just like other methods of bariatric surgery, is not equally effective for each patient.

Although our study has some assets, such as the employment of standardized, reliable questionnaires and the focus on psychosocial functioning in a wide variety of domains of life, some weaker points could also be indicated. For instance, we were not able to retain all patients of our preoperative sample. This problem is also identified by others who suggest that patients' participation in psychological follow-up is much lower than in follow-up visits for other specialists of the bariatric team [37].

Although we found mixed results, the overall psychosocial improvements provide additional justification for vertical banded gastroplasty as a surgical treatment option for extreme obesity. However, as some improvements wane over time and not all patients profit in the same way, surgery alone may not be sufficient to sustain success. Consequently, additional behavioral treatment may be necessary.

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